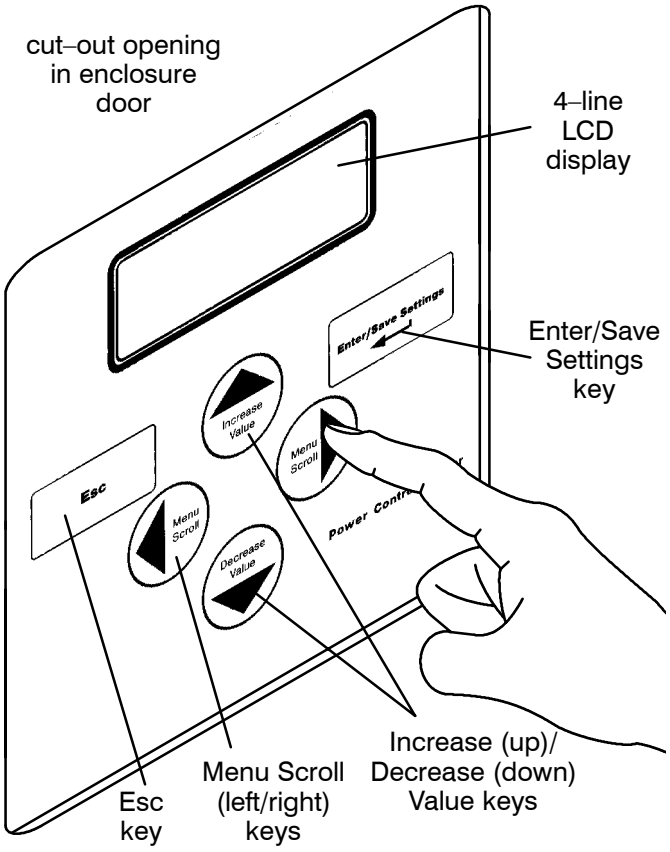
User's Guide

Group 5 Controller for ASCO® 4000 & 7000 Series Automatic Transfer Switch Products



Power Control Center keypad and display

⚠ DANGER

DANGER is used in this manual to warn of high voltages capable of causing shock, burns, or death.

⚠ WARNING

WARNING is used in this manual to warn of possible personal injury.

⚠ CAUTION

CAUTION is used in this manual to warn of possible equipment damage.

Refer to the outline and wiring drawings provided with the 4000 or 7000 Series ATS product for all installation and connection details and accessories.

Refer to the *Operator's Manual* for the ASCO 4000 or 7000 Series ATS product for installation, functional testing, sequence of operation,and troubleshooting.

Description

ASCO 4000 & 7000 Series Automatic Transfer Switch products utilize the Group 5 Controller for sensing, timing, and control functions. This state–of–the art microprocessor–based controller includes a built–in keypad and a four–line LCD display. All monitoring and control functions can be done with the enclosure door closed for greater convenience. In addition, all changes in voltage settings (except for nominal voltage) and time delays can be made through a system of menus.

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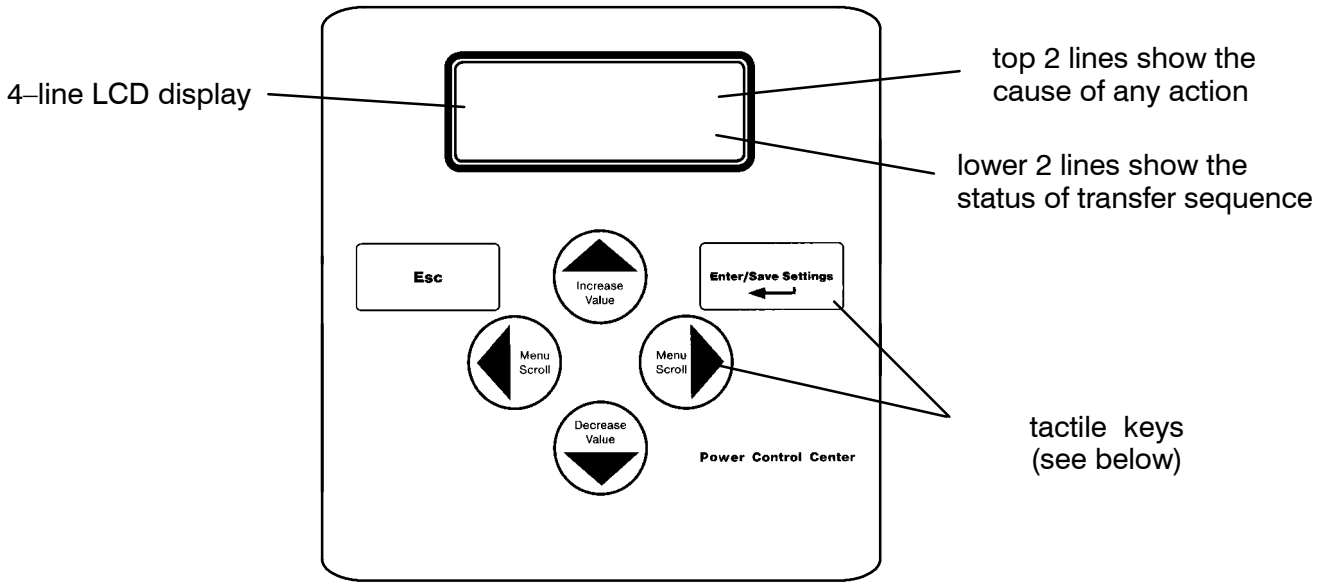
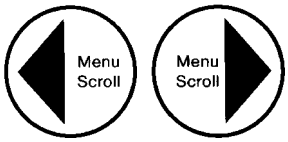
EMERSON Network Power

Control Overview

On the Power Control Center, six keys allow access to all monitoring and setting functions. Two levels of screens are used. The *status level* provides information about the automatic transfer switch. The *settings level* allows configuration of the controller. Access to some settings may require entering a password (if the controller is set for one – see page 2–1 and Appendix A–3).



Power Control Center display and keypad.

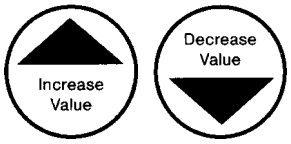


Left–Right Arrows

The left ◀ and right ▶ arrow keys (*Menu Scroll*) navigate through the screens.

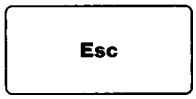
Enter/Save Settings

The *Enter/Save Settings* ↲ key move from the status level to the settings level screens. It also is used to enter a new setting.



Up–Down Arrows

The up ▲ and down ▼ arrow keys (*Increase Value* and *Decrease Value*) modifies a setting (setup parameter) while in the settings level screens.



Esc key

The *Esc* key ignores a change and returns to the status level.

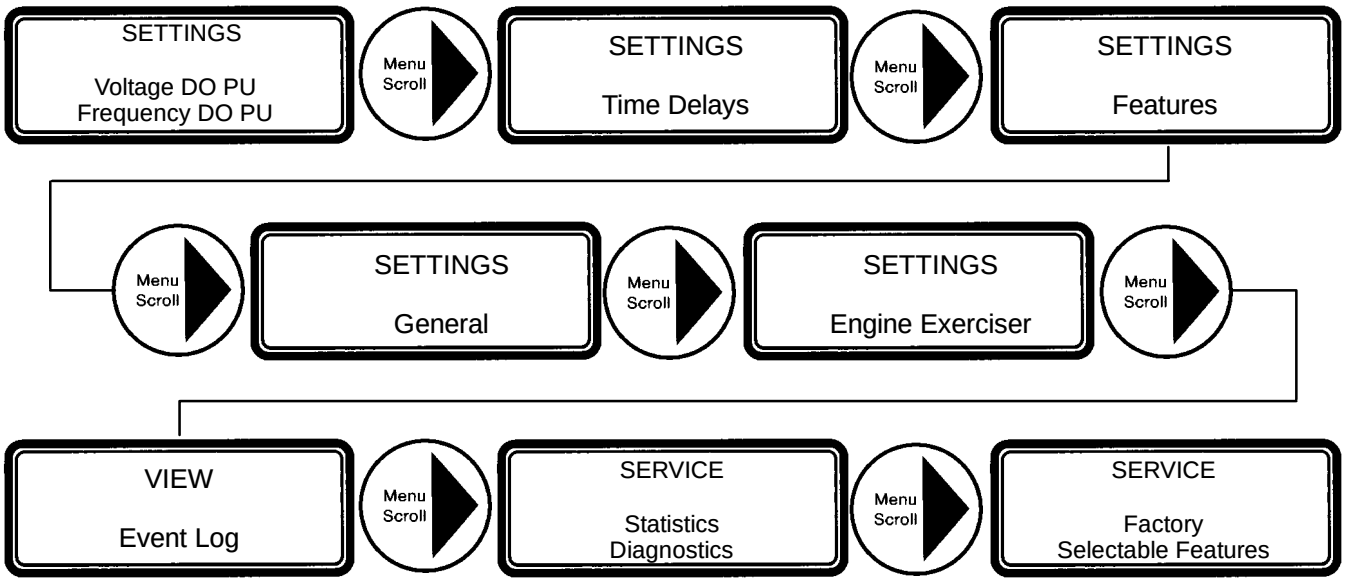
Settings Overview

The controller settings can be displayed and changed from the keypad. Some settings may require a password (if the controller is set up for one).

From the **ATS Status** display, press **Enter/Save Settings** ↲ key to move to the **Settings** level of menus.

Press the right arrow key ▶ to see the eight parameter information headings (as shown below). An overview of each setting is listed below. The detailed menus for each setting are on the following pages.

8 Parameter Menus (loop back to beginning)



Voltage and Frequency Settings see page 2–2
CP settings and Normal & Emergency voltage and frequency pickup & dropout.

Time Delay Settings see page 2–4
Bypass running time delay, and settings for all standard time delays.

Features Settings see page 2–6
Commit on transfer, shed load, phase rotation, and inphase monitor settings.

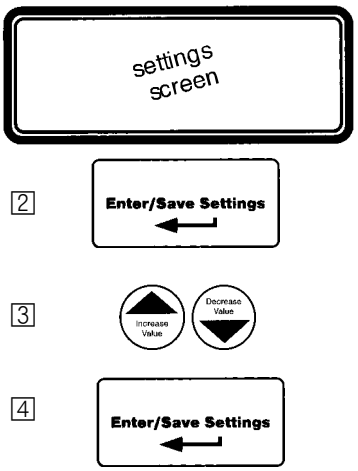
General Settings see page 2–8
Reset settings, language, communication, logging, and password.

Engine Exerciser Settings see page 2–10
Present date and time, seven exercise programs each with six parameters.

View Event Log see page 2–12
Last 99 events in date and time order; six types and seven reasons are logged.

Service Statistics/Diagnostics, Factory Selectable Features
For factory service use only. see pages 2–13

How to Change a Setting



To change a setting in the controller (CP):

1 Navigate to the settings screen that you want to change (see page 1–2).

2 Press **Enter/Save Settings** ↲ key to start the first field blinking. If the controller requires a password, see below.

3 Press up ▲ and down ▼ arrow keys to change flashing digit(s) or word and press **Enter/Save Settings** ↲ key to move to next field.

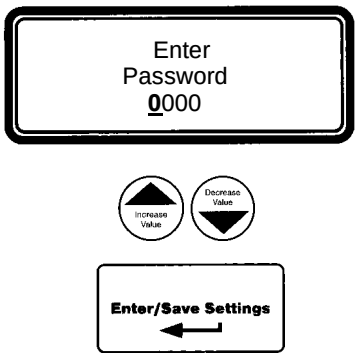
4 Repeat step 3 until all the fields have been entered.

Tips ☞ If a field is blinking, the CP is waiting for information to be entered.

The **Esc** key will end the editing session.

Password

Tip ☞ **Default password is 1111** (see page 2–8)



If **Enter Password** displays, you must enter the correct password first.

Use the up ▲ and down ▼ arrow keys to change the flashing digit of the password. Press the **Enter/Save Settings** ↲ key to move to next next digit (left to right). When the correct password is displayed, press the **Enter/Save Settings** ↲ key.

If *WRONG PASSWORD !!!* displays, you are returned to the first flashing digit. When the correct password is displayed, press the **Enter/Save Settings** ↲ key.

You can now change the settings on the selected screen.

Tip ☞ Once the password is entered it will stay *unlocked* for 5 minutes after last key is pushed so that you do not have to keep entering it. So, to save time, plan to make all your settings at one time.

Voltage & Frequency Settings

Unless otherwise specified on the order, the controller voltage and frequency settings are set at the factory to the default values. If a setting must be changed, carefully follow the procedure on the next page. Some settings may require a password (if the controller is set up for one).

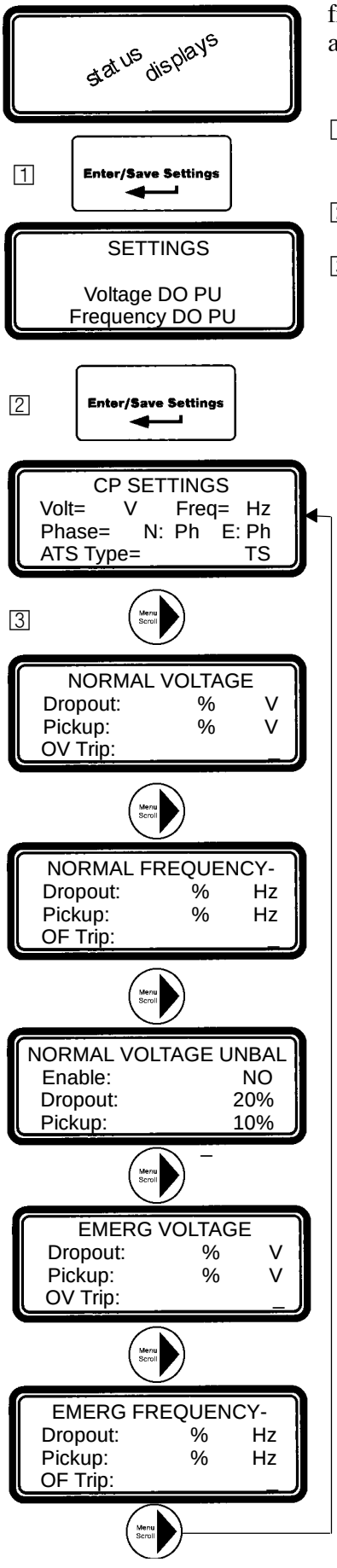
⚠ CAUTION

Any indiscriminate change in these settings may affect the normal operation of the Automatic Transfer Switch. This change could allow the load circuits to remain connected to an inadequate source.

Description	Settings	Default Setting % of nominal	Adjustment Range increments of 1%	Display Screen (see next page)
Normal Source Voltage	Dropout	85 %	70 to 98 %	NORMAL VOLTAGE Dropout
	Pickup	90 %	85 to 100 %	NORMAL VOLTAGE Pickup
	Over Voltage Trip *	off	102 to 115 %	NORMAL VOLTAGE OV Trip
	Unbalance Enable	no	yes or no	NORMALVOLTAGEUNBAL Enable
	Unbalance Dropout	20 %	5 to 20 %	NORMALVOLTAGEUNBAL Dropout
	Unbalance Pickup	10 %	3 to 18 %	NORMALVOLTAGEUNBAL Pickup
Emergency Source Voltage	Dropout	75 %	70 to 98 %	EMERG VOLTAGE Dropout
	Pickup	90 %	85 to 100 %	EMERG VOLTAGE Pickup
	Over Voltage Trip *	off	102 to 115 %	EMERG VOLTAGE OV Trip
	Unbalance Enable	no	yes or no	EMERG VOLTAGE UNBAL Enable
	Unbalance Dropout	20 %	5 to 20 %	EMERG VOLTAGE UNBAL Dropout
	Unbalance Pickup	10 %	3 to 18 %	EMERG VOLTAGE UNBAL Pickup
Normal Source Frequency	Dropout	90 %	85 to 98 %	NORMAL FREQUENCY Dropout
	Pickup	95 %	90 to 100 %	NORMAL FREQUENCY Pickup
	Over Frequency Trip *	off	102 to 110 %	NORMAL FREQUENCY OF Trip
Emergency Source Frequency	Dropout	90 %	85 to 98 %	EMERG FREQUENCY Dropout
	Pickup	95 %	90 to 100 %	EMERG FREQUENCY Pickup
	Over Frequency Trip *	off	102 to 110 %	EMERG FREQUENCY OF Trip

* The Over Voltage and Over Frequency reset is fixed at 2% below the trip setting.

Voltage & Frequency Settings



The controller (CP) voltage and frequency setting can be displayed and changed from the keypad. See the table on the previous page. Some settings may require a password (if the controller is set up for one).

1 From any of the **Status** displays, press the **Enter/Save Settings** ↵ key to move to the **Settings** level of menus.

2 Press the **Enter/Save Settings** ↵ key to move to the **CP Settings** display.

3 Then you can press the **right arrow** ▶ key to see the other voltage and frequency displays (as shown below). An overview explanation of each setting is listed below.

5 Voltage & Frequency Menus (last menu loops back to first)

CP Settings see page 2–1

This display shows the base configuration of the controller. These settings are hardware activated and cannot be changed from the keypad:

Nominal source voltage — Normal and Emergency sources
Nominal source frequency — 50 or 60 Hz
Normal & Emergency source sensing — single or 3 phase
Switch type — open, closed, or delayed transition

Normal Voltage see page 2–1

This display shows pickup, dropout, and over–voltage trip settings for the Normal source. They are in percentage of nominal voltage and volts rms.

Normal Frequency see page 2–1

This display shows pickup, dropout, and over–frequency trip settings for the Normal source. They are in percentage of nominal frequency and Hz.

Normal Voltage Unbalance see page 2–1

This display appears only if the CP is set for 3 phase sensing on Normal. When enabled, the CP considers the Normal source unacceptable if the calculated voltage unbalance is greater than the specified dropout.

Emerg Voltage see page 2–1

This display shows pickup, dropout, and over–voltage trip settings for the Emergency source. They are in percent of nominal voltage and volts rms.

Emerg Frequency see page 2–1

This display shows pickup, dropout, and over–frequency trip settings for Emergency source. They are in percentage of nominal frequency and Hz.

Emerg Voltage Unbalance (not shown) see page 2–1

This display appears only if the CP is set for 3 phase sensing on Emergency. When enabled, the CP considers the Emergency source unacceptable if the calculated voltage unbalance is greater than the specified dropout.

Time Delay Settings

Unless otherwise specified on the order, the Controller time delay settings are set at the factory to the default values. If a setting must be changed, follow the procedure on the next page. Some settings may require a password (if controller is set up for one).

⚠ CAUTION

Any indiscriminate change in these settings may affect the normal operation of the Automatic Transfer Switch. This change could allow the load circuits to remain connected to an inadequate source.

Feature	Time Delay	Default Setting	Adjustment Range 1 sec. increments	Display Screen (see next page)
1C ③	override momentary Normal source outages	1 second	0 to 6 sec see **CAUTION** below	TD NormFail
1F	override momentary Emergency source outages	0	0 to 60 min 59 sec	TD EmrgFail
2B	transfer to Emergency	0	0 to 60 min 59 sec	TD N>E
2E	unloaded running (engine cooldown)	5 minutes	0 to 60 min 59 sec	TD EngCool
3A	retransfer to Normal (if Normal fails)	30 minutes	0 to 60 min 59 sec	TD E>N if Normal Fail
	retransfer to Normal (if just a test)	30 seconds	0 to 9 hours 59 min 59 sec	TD E>N if Test Mode
31F ④	Normal to Emergency pre–transfer signal	0	0 to 5 min 59 sec	TD N>E Xfer Signal PreXfer
31M ④	Normal to Emergency post–transfer signal	0	0 to 5 min 59 sec	TD N>E Xfer Signal PostXfer
31F, 31M	bypass 31F & 31M if Normal fails	no	yes or no	TD N>E Xfer Signal BypassIfNFail
31G ④	Emergency to Normal pre–transfer signal	0	0 to 5 min 59 sec	TD E>N Xfer Signal PreXfer
31N ④	Emergency to Normal post–transfer signal	0	0 to 5 min 59 sec	TD E>N Xfer Signal PostXfer
31G, 31N	bypass 31G & 31N if Emergency fails	no	yes or no	TD E>N Xfer Signal BypassIfEFail
4ACTS, 7ACTS, 7ACTB only①	in sync	1.5 second	0 to 3.0 seconds 0.1 sec increments	CTTS TD SyncMonitorTD
	failure to synchronize	5 minutes	0 to 5 min 59 sec	CTTS TD FailToSyncTD
	extended parallel time	0.5 second	0.100 to 1.000 sec 0.01 sec increments	CTTS TD XtdParallelTD
4ADTS, 7ADTS/B only②	delay transition time	0	0 to 5 min 59 sec	DTTS TD LoadDisconnDelay

① These time delays appear only on the display for a 4ACTS, 7ACTS, or 7ACTB closed–transition transfer switch.

② This time delay appears only on the display for a 4ADTS, 7ADTS, or 7ADTB delayed–transition transfer switch

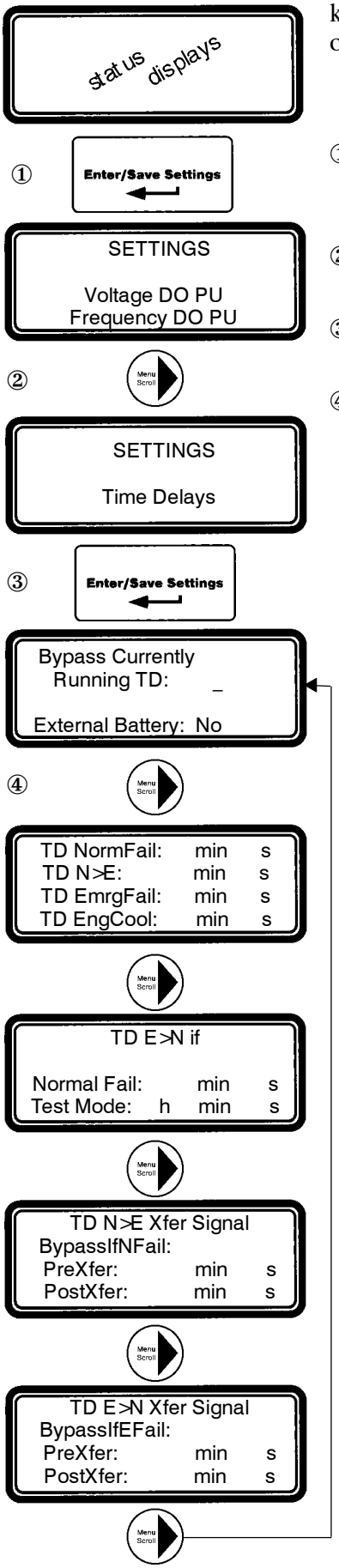
③ Standard adjustment up to 6 seconds (total power outage). For additional time delay contact ASI. **See CAUTION**.

④ If output contacts required, contact ASI at 1–800–800–2726.

⚠ CAUTION

Do not set Feature 1C TD longer than 6 sec. unless an external 24 V dc power supply is included. Contact ASI if longer than 6 sec. is required.

Time Delay Settings



The controller time delay (TD) settings can be displayed and changed from the keypad. Some settings may require a password (if the control panel is set up for one).

① From any of the **Status** displays, press the **Enter/Save Settings** key to move to the **Settings** level of menus.

② Press the **right arrow ›** key to move to the **Setting Time Delays** display.

③ Now press **Enter/Save Settings** key to move to the first **Time Delay** menu.

④ You can press the **right arrow ›** key to see the other time delay menus (as shown below). An overview explanation of each setting is listed below.

5 Time Delay Menus (last menu loops back to first)

Bypass Currently Running TD see page 2–1

This display allows you to bypass some time delays. When the display is set to **Yes** the controller will bypass any of these time delays

Feature 1C — Momentary Normal failure time delay
Feature 2B — Normal to Emergency transfer time delay
Feature 3A — Emergency to Normal transfer time delay

External Battery: see CAUTION on bottom of page 2–4

Yes means external battery connected, Feature 1C can be set longer than 6 sec.
No mean there is no external battery, Feature 1C can be set for 0–6 sec. only

Standard Time Delays see page 2–1

This display shows the settings for the following standard time delays:

Feature 1C — Momentary Normal source failure time delay
Feature 2B — Normal to Emergency transfer time delay
Feature 1F — Momentary Emergency source failure time delay
Feature 2E — Engine cooldown time delay

TD E>N if see page 2–1

This display shows the settings for Feature 3A retransfer to Normal time delay. There are two modes:

Normal source outage — retransfer TD if Normal fails
Transfer Test — retransfer TD if just a test

TD N>E Xfer Signal see page 2–1

This display shows the settings for the time delays used to signal external equipment before and after transfer from Normal to Emergency:

Feature 31F — Pre–transfer time delay signal
Feature 31M — Post–transfer time delay signal

TD E>N Xfer Signal see page 2–1

This display shows the settings for the time delays used to signal external equipment before and after retransfer from Emergency to Normal:

Feature 31G — Pre–transfer time delay signal
Feature 31N — Post–transfer time delay signal

CTTS TDs (not shown) see page 2–1

DTTS TD (not shown) see page 2–1

Features Settings

Unless otherwise specified on the order, the controller features settings are set at the factory to the default values. If a setting must be changed, follow the procedure on the next page. Some settings may require a password (if the controller is set up for one).

⚠ CAUTION

Any indiscriminate change in these settings may affect the normal operation of the Automatic Transfer Switch. This change could allow the load circuits to remain connected to an inadequate source.

Feature	Default Setting	Adjustment Range	Display Screen (see next page)
commit to transfer	no	yes or no	Commit to Xfer After TD Norm Fail
shed load direction	from E	from N or from E	SHED LOAD Direction
shed load in phase	no	yes or no	SHED LOAD InPhase
shed load in phase time delay	1.5 second	0 to 3.0 seconds 0.1 sec increments	SHED LOAD TD
shed load isolate load on source failure ②	yes	yes or no	SHED LOAD IsoLoadOnSrcFail
shed load isolate load on test 17 ②	no	yes or no	SHED LOAD IsoLoadOnTest17
phase rotation monitor enable ③	no	yes or no	PHASE ROTATION MONITOR Enable
phase rotation monitor reference ③	ABC	ABC or CBA	PHASE ROTATION MONITOR Reference
inphase monitor enable ④	no	yes or no	IN–PHASE MONITOR Enable
inphase monitor time delay ④	1.5 second	0 to 3.0 seconds 0.1 sec increments	IN–PHASE MONITOR Time Delay
failure to sync auto bypass ①	no	yes or no	CTTS BYPASS/SHED LD FailSyncAutoByps
bypass time delay ①	0 second	0 to 59 seconds 1 sec increments	CTTS BYPASS/SHED LD Bypass DT Delay
bypass in phase ①	no	yes or no	CTTS BYPASS/SHED LD Bypass InPhase
Y–Y primary failure detection enable	no	yes or no	Y–Y PRI FAIL DETECT Enable
Y–Y primary failure sensing time delay	1.0 second	0 to 9.9 seconds 0.1 sec increments	Y–Y PRI FAIL DETECT Sense Delay
Y–Y primary failure retransfer time delay	1.0 hour	0 to 23 hrs 59 min. 1 min. increments	Y–Y PRI FAIL DETECT TD E>N Y–Y

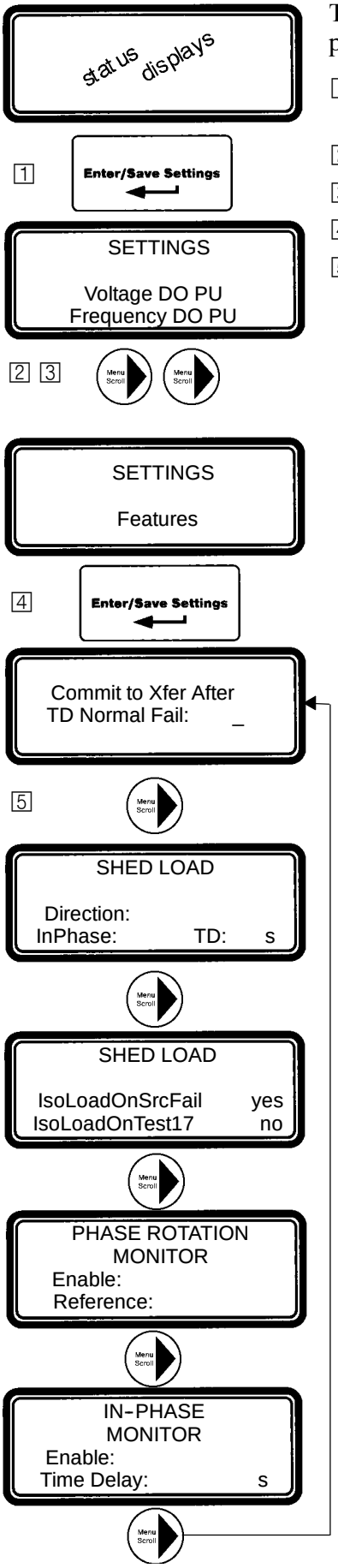
① These features appear only on the display for a 4ACTS, 7ACTS, or 7ACTB closed–transition transfer switch.

② These features appear only on the display for a 4ACTS, 7ACTS or 7ACTB closed–transition transfer switch or a 4ADTS, 7ADTS, or 7ADTB delayed–transition transfer switch.

③ These features do not appear on the display unless both sources have 3 phase sensing enabled.

④ These features appear only on a 4ATS, 7ATS, or 7ATB (open–transition automatic transfer switch).

Features Settings



The controller (CP) Features settings can be displayed and changed from the keypad. Some settings may require a password (if the controller is set up for one).

1 From any of the **Status** displays, press the **Enter/Save Settings** ↲ key to move to the **Settings** level of menus.

2 Then press the **right arrow** ▶ key to move to **Setting Time Delays** menu.

3 Press the **right arrow** ▶ key again to move to **Settings Features** menu.

4 Now press **Enter/Save Settings** ↲ key to move to the first **Features** display

5 You can press the right arrow ▶ key to see the other Features menus (as shown below). An overview explanation of each setting is listed below.

7 Features Menus (last menu loops back to first)

Commit to Xfer After TD Normal Fail see page 2–1

This display shows the commit to transfer setting. It affects the transfer sequence as follows:

Yes — If Normal fails, CP continues transfer sequence to emergency even if Normal returns before Emergency becomes acceptable.

No — If Normal fails, CP cancels the transfer sequence to emergency if Normal returns before Emergency becomes acceptable.

Shed Load see page 2–1

This display shows status of 3 load shed parameters:

Direction — from Emergency or from Normal

InPhase — yes means transfer delayed until sources are in phase

TD — 3 second default time delay

Shed Load Options see page 2–1

This display appears only for 4ACTS, 4ADTS, 7ACTS, 7ACTB, 7ADTS, or 7ADTB. It determines switch position after the shed load transfer.

IsoLoadOnSrcFail — determines switch position during a source failure.

IsoLoadOnTest17 — deterines switch position during feature 17 activation.

Yes — Load is not connected to either source. (see wiring diagram

No — Load is connected to the opposite source. for feature 17 desc.)

Phase Rotation Monitor see page 2–1

This display shows status of phase rotation monitor and desired reference phase rotation. It only appears if both sources are set to 3–phase sensing.

Enabled — Yes means phase rotation is considered as part of the source acceptability criteria for each source. If the phase rotation of the source does not match the reference phase rotation, that source is considered unacceptable. If phase rotation of the two sources is different, the load will be transferred to the source with the reference phase rotation.

Reference — phase rotation order: ABC or CBA (ABC is default)

In–Phase Monitor see page 2–1

This display appears only for 4ATS, 7ATS or 7ATB. This display shows status of in–phase monitor and in–phase time delay (1.5 seconds is default setting).

Enabled — Yes means in–phase transfer is initiated when any of these conditions are met: Transfer Test (Feature 5) signal, connected source fails, retransfer to acceptable Normal occurs and Emergency source acceptable.

CTTS Bypass / Shed Load (not shown) see page 2–1

This display shows status of the closed–transition bypass options.

FailSyncAutoBypass — Yes means if the fail to sync alarm occurs, the controller will bypass the closed–transition mode and will make a delayed–transiton transfer. The load disconnect time is set by the **Bypass DT Delay** parameter.

Bypass InPhase — Yes means the inphase monitor is active during load transfer.

Y – Y Primary Failure Detection (not shown) see page 2–1

This display shows status of a special control algorithm which is described in *Application Note 381339–276*.

Enable – Yes means the algorithm is activated to detect Normal primary single phase failure in Y–Y systems.

Sense Delay — 1 second default time delay.

TD E>N Y–Y — 1 hour default time delay.

Note: This function should only be considered for use where the Normal source is provided through a Y–Y transformer. This function requires the Normal source voltage unbalance monitoring to be enabled.

General Settings

Unless otherwise specified on the order, the controller general settings are set at the factory to the default values. If a setting must be changed, follow the procedure on the next page. Some settings may require a password (if the controller is set up for one).

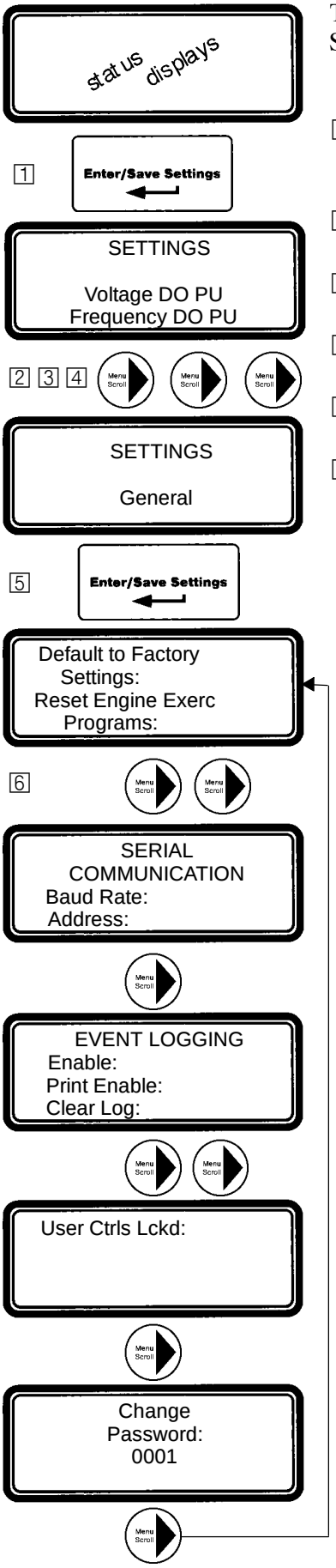
⚠ CAUTION

Any indiscriminate change in these settings may affect the normal operation of the Automatic Transfer Switch. This change could allow the load circuits to remain connected to an inadequate source

Parameter	Default Setting	Adjustment Range	Display Screen (see next page)
language	ENGLISH*	ENGLISH FRENCH CDN ENGLISH EU ENGLISH EU S1–S2 ENGLISH S1–S2* SPANISH GERMAN PORTUGUESE	Menu Language ENGLISH
serial communications baud rate	19.2k	off, x9600, 9600, 19.2k, Mbus9600, Mbus19.2k	SERIAL COMMUNICATION Baud Rate
serial communications address	1	0 to 63	SERIAL COMMUNICATION Address
event log enable	no	yes or no	EVENT LOGGING Enable
print enable	no	yes or no	EVENT LOGGING Print Enable
clear log	no	yes or no	EVENT LOGGING Clear Log
door–mounted user controls locked but not the *Power Control Center* (this setting on 4000 Series only)	no	yes or no	Keypad Locked
password	1111	4 characters letters or numbers	Change Password

* **Note**: If the language setting *ENGLISH S1–S2* is selected the usual display words *Normal (N)* and *Emergency (E)* are changed to *Source 1 (S1)* and *Source 2 (S2)*.

General Settings



The controller (CP) general setting can be displayed and changed from the keypad. Some settings may require a password (if the controller is set up for one).

1 From any of the **Status** displays, press **Enter/Save Settings** ↲ key to move to the **Settings** level of menus.

2 Press the **right arrow** ▶ key to move to **Setting Time Delays** menu.

3 Press the **right arrow** ▶ key again to move to **Settings Features** menu.

4 Press the **right arrow** ▶ key again to move to **Settings General** menu.

5 Now press **Enter/Save Settings** ↲ key to move to the first **General** display

6 You can press the right arrow ▶ key to see the other General menus (as shown below). An overview explanation of each setting is listed below.

6 General Settings Menus (last menu loops back to first)

Default to Factory Settings see page 2–1
This display (upper half) allows the user to reset the majority of controller settings to their factory default values.

Reset Engine Exerc Programs see page 2–1
This display (lower half) also allows the user to reset the engine exerciser routines. YES means reset. NO means do not reset.

Menu Language (not shown) see page 2–1
This display shows the language in which the messages will be shown.
English is the default language.

Serial Communication see page 2–1
This display allows the user to configure the serial communications port of the controller.
Baud Rate — off, 9600, x9600. 19.2 k, Mbus9600, Mbus19.2k
x9600 selects 9600 and the Group 1/7 CP protocol
Address — can be set from 0 to 63

Event Logging see page 2–1
This display allows the user to enable the event logging feature of the controller and to clear the event log.
Enable — YES means to start event logging; NO means turn it off.
Print Enable — YES means enables printer option; NO turns it off.
Clear Log — YES means erase the event log; NO means keep it.

Print Event Log (not shown) see page 2–1
This display shows the status of the optional printer.
Also see Printer Interface Module instructions 381339–218.

User Controls Locked (on 4000 Series only)
see page 2–1
This display allows the user to lock or unlock the door–mounted user controls. (not the *Power Control Center*). YES means locked. NO means unlocked.

Change Password see page 2–1
This display allows the user to change the controller password.

Engine Exerciser Settings

Unless otherwise specified on the order, the controller engine exerciser settings are set at the factory to the default values. If a setting must be changed, follow the procedure on the next page. Some settings may require a password (if the controller is set up for one).

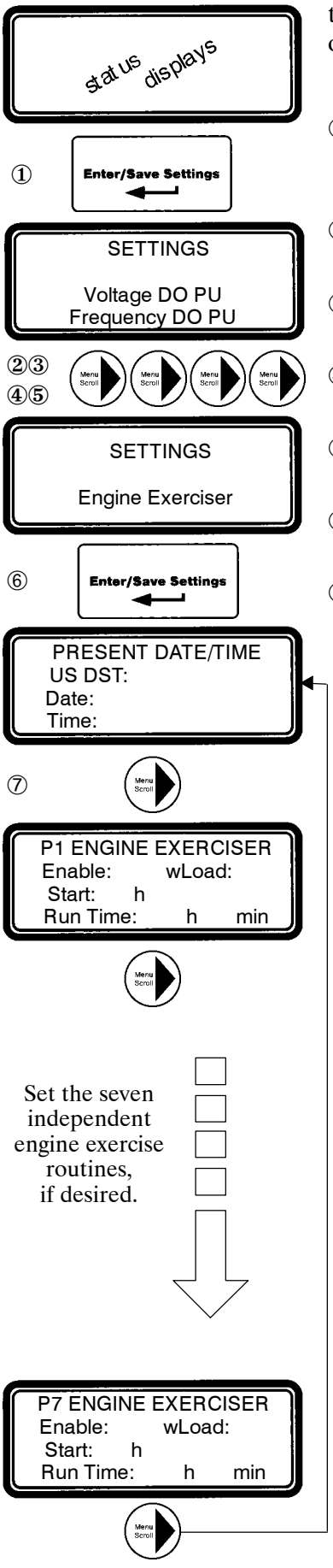
⚠ CAUTION

Any indiscriminate change in these settings may affect the normal operation of the Automatic Transfer Switch. This change could allow the load circuits to remain connected to an inadequate source

Parameter	Default Setting	Adjustment Range	Display Screen (see next page)
month	JAN	JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC	PRESENT DATE/TIME Date
day	1	1 to 31	PRESENT DATE/TIME Date
year *	1	00 to 99	PRESENT DATE/TIME Date
hour	1	0 to 23	PRESENT DATE/TIME Time
minute	1	0 to 59	PRESENT DATE/TIME Time
engine exerciser enable (P1 to P7)	no	yes or no	P1 ENGINE EXERCISER Enable
engine exerciser transfer load (P1 to P7)	no	yes or no	P1 ENGINE EXERCISER wLoad
engine exerciser start hour (P1 to P7)	0	0 to 23	P1 ENGINE EXERCISER Start h
engine exerciser start minute (P1 to P7)	0	0 to 59	P1 ENGINE EXERCISER Start min
engine exerciser run week (P1 to P7)	all	all, alternate, first, second, third, fourth, or fifth	
engine exerciser run day (P1 to P7)	SUN	SUN, MON, TUE, WED, THU, FRI, SAT	
engine exerciser duration hours (P1 to P7)	0	0 to 23	P1 ENGINE EXERCISER Run TIme h
engine exerciser duration minutes (P1 to P7)	0	0 to 59	P1 ENGINE EXERCISER Run TIme min

* For the year 2000, enter 00.

Engine Exerciser Settings



The controller (CP) engine exerciser setting can be displayed and changed from the keypad. Some settings may require a password (if the controller is set up for one).

① From any of the **Status** displays, press **Enter/Save Settings** key to move to the **Settings** level of menus.

② Press the **right arrow ›** key to move to **Setting Time Delays** menu.

③ Press the **right arrow ›** key again to move to **Settings Features** menu.

④ Press the **right arrow ›** key again to move to **Settings General** menu.

⑤ Press the **right arrow ›** key again to move to **Settings Engine Exerciser**.

⑥ Now press **Enter/Save Settings** key to move to the first **Engine Exerciser** menu.

⑦ You can press the right arrow › key to see the other Engine Exerciser menus (as shown below). An overview explanation of each setting is listed below.

8 Engine Exerciser Settings Menus
(last menu loops back to first)

Present Date/Time see page 2–1

This display allows the user to change the controller date and time.

US DST — US Daylight Saving Time. APR – OCT, MAR – NOV, or OFF. MAR – NOV begins in 2007.

P(1—7) Engine Exerciser(s) see page 2–1

These displays (P1 through P7) allow the user to set the controller's seven independent engine exerciser routines. Each routine functions in the same manner. Six parameters need to be configured for each routine (P1, P2, P3, P4, P5, P6, P7 — not all have to be used).

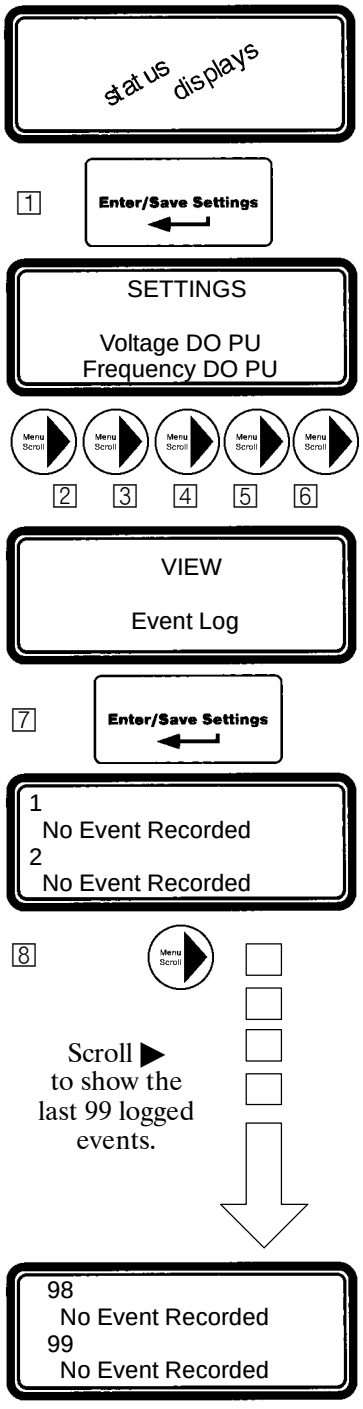
Enable — YES enables the routine; NO turns it off.

wLoad — YES transfers load to Emergency; NO = no transfer.

Start — when the routine will start the generator
- time (hour, minute)
- week (all, alternate, 1st, 2nd, 3rd, 4th, or 5th week)
- day of the week (mon, tue, wed, thu, fri, sat, sun)

Run Time — duration (length of time) that the generator will run.

View Event Log



The controller event logging feature can be displayed from the keypad. Some settings may require a password (if the controller is set up for one).

1 From any of the **Status** displays, press **Enter/Save Settings** ↲ key to move to the **Settings** level of menus.

2 Press the **right arrow** ▶ key to move to **Setting Time Delays** menu.

3 Press the **right arrow** ▶ key again to move to **Settings Features** menu.

4 Press the **right arrow** ▶ key again to move to **Settings General** menu.

5 Press the **right arrow** ▶ key again to move to **Settings Engine Exerciser**.

6 Press the **right arrow** ▶ key again to move to **View Event Log**.

7 Now press **Enter/Save Settings** ↲ key to move to the events logged display.

8 You can press the right arrow ▶ key to see the other events logged. An overview explanation of each setting is listed below.

Logged Events

This display shows the last 99 logged events. Each event display shows the event number (1 is the most recent, 99 is the oldest), the time and date of the event, the event type, and the event reason (if applicable).

Event Types

Nine types of events are logged. They are (displayed event & meaning) :

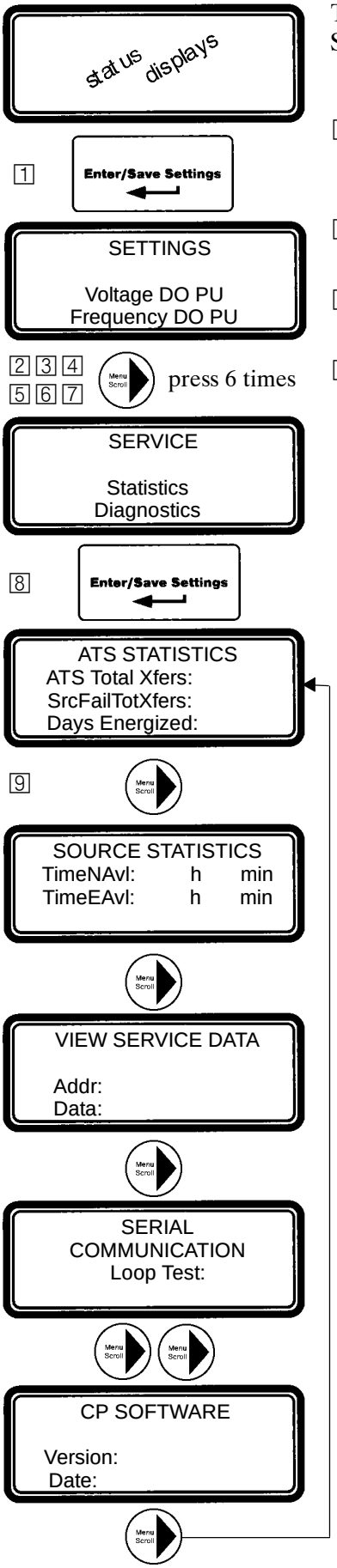
Eng Start	The controller has signaled the engine to start
Xfer N>E	The controller has initiated transfer from normal to emergency
Xfer E>N	The controller has initiated transfer from emergency to normal
Eng Stop	The controller has signaled the engine to stop
EmergAcc	The emergency source has become acceptable
EmergNAcc	The emergency source has become not acceptable
NormAcc	The normal source has become acceptable
NormNAcc	The normal source has become not acceptable
XfrAbort	The transfer has been aborted

Event Reasons

Twenty–one reasons for events are logged. They are (displayed reason & meaning):

LoadShed	Load shed requested
NormFail	Normal source failure
ManualXfr	Manual transfer
Test 5	Test requested (Feature 5)
Test 17	Test requested (Feature 17)
Comm	Serial communications
EngExerc	Engine Exerciser
EmergFail	Emerg source failure
NormUV	Normal source under voltage
NormOV	Normal source over voltage
NormUF	Normal source under frequency
NormOF	Normal source over frequency
NormPHR	Normal source phase rotation
NormVUNB	Normal source voltage unbalance
EmergUV	Emergency source under voltage
EmergOV	Emergency source over voltage
EmergUF	Emergency source under frequency
EmergOF	Emergency source over frequency
EmergPHR	Emergency source phase rotation
EmergVUNB	Emergency source voltage unbalance
Feature 6	Feature 6 activated

Service — Statistics / Diagnostics



The controller service statistics / diagnostics can be displayed from the keypad. Some settings may require a password (if the controller is set up for one).

1 From any of the **Status** displays, press **Enter/Save Settings** ↲ key to move to the **Settings** level of menus.

2 3 4 5 6 7 Press **right arrow** ▶ key <u>six times</u> to move to **Service** menu.

8 Now press **Enter/Save Settings** ↲ key to move to the first **Service** menu.

9 You can press the right arrow ▶ key to see the other Service menus (as shown below). An overview explanation of each setting is listed below.

7 Service Menus (last menu loops back to first)

ATS Statistics

This display shows the total number of transfers, the total number of transfers due to source failures, and the total number of days that the ATS has been energized since the controller has been installed. These values cannot be reset.

Source Statistics

This display shows the total time that the normal and emergency sources have been acceptable since installation of the controller. These values cannot be reset.

View Service Data

This display is for service personnel only.

Serial Communication

This display allows the user to test the serial communications port of the controller. To perform the test, the transmit lines of the serial communications port are connected to the receive lines so that the signals sent by the controller are also received by the controller. The test is activated by pressing the **Enter/Save Settings** ↲ key while viewing this display. If the controller receives the same information that it sent, test is passed, otherwise it fails.

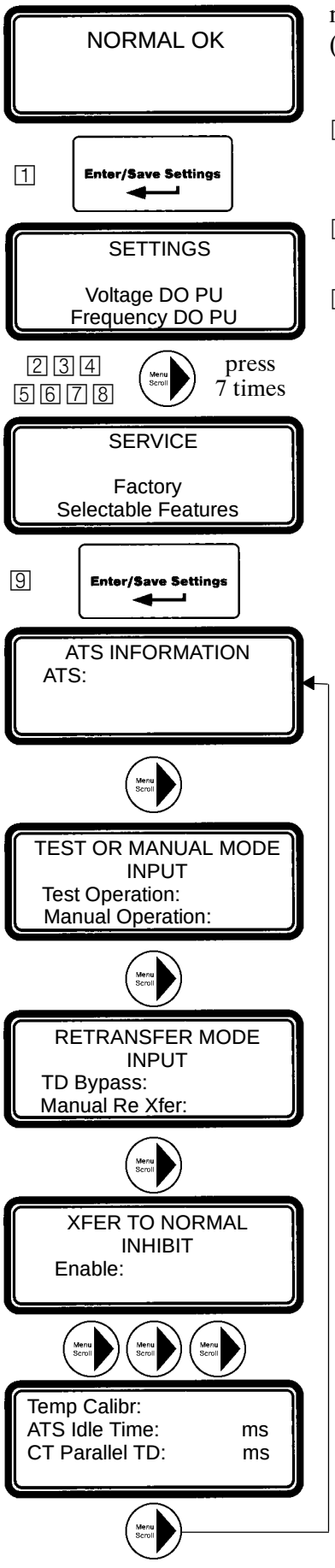
I/O Status (not shown)

These displays show the status of several of the controller's input and output lines.

CP Software

This display shows the version of the loaded software and the date of its release.

Service — Factory Selectable Features



The controller service factory selectable features can be displayed from the membrane controls. These factory settings should not be changed by the customer (they cannot be changed without entering the factory password).

1 From the **ATS Status** display (NORMAL OK), press **Enter/Save Settings** ↲ button to move down to the **Settings** level of menus.

2 3 4 5 6 7 8 Press **right arrow** ▶ button 7 times to move to **Service** menu.

9 Now press **Enter/Save Settings** ↲ button to move down to the first **Service** factory selectable feature.

You can press the right arrow ▶ button to see the other Service menus (as shown below). An overview explanation of each setting is listed below.

8 Service Menus (last menu loops back to first)

ATS Information

This display shows the transfer switch ampere size, whether the switch is a bypass switch or a non–bypass switch, and any name or description inform–ation that has been assigned to it through the serial communications port.

Test or Manual Mode Input

This display shows the setting of the Feature 5/6Z input. This input can be used for either Feature 5 or 6Z. Yes means active; no means not used.

Test Operation — Feature 5
Manual Operation — Feature 6Z
This Feature is not available for automatic operation.

Retransfer Mode Input

This display shows the settings for Features 6B/6C inputs. This input can be used for either Feature 6B or 6C. Yes means active; no means not used.

TD Bypass — Feature 6B
Manual Re Xfer — Feature 6C

These Features are typically set to *Yes* with the inhibit Feature overridden with external factory wiring. These Features are not available for customer use.

Xfer to Normal Inhibit and Emergency (not shown)

This display shows whether the Feature 34A input is enabled (yes) or disabled (no).

Likewise, the next display **Xfer to Emerg** shows whether the Feature 34B input is enabled (yes) or disabled (no).

Factory Calibration (not shown)

This display is for factory calibration only and should be used by factory personnel only.

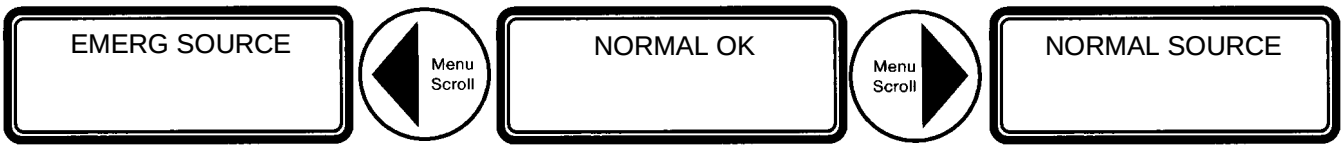
Other

These displays show various parameters that should be accessed by factory personnel only.

Status Information

The controller (CP) provides the status of the automatic transfer switch (ATS) and of both the normal and emergency sources. This information is at the *status level* of all screens and no password is required to view them.

You can press the right arrow ▶ key to see the status of the Normal Source or press the left arrow ◀ key to see the status of the Emergency source (the menus loop back).



ATS Status

The ATS Status is the primary display. It shows the present status of the ATS. Transfer sequence status and running time delays are shown. For inphase or closed–transition transfers, phase relation between the sources is also shown.

Tip ☞

The ATS Status display can be directly reached from anywhere in the menu structure by pressing the *Esc* key three times.

Normal Source Status

The Normal Source Status display shows the rms voltage of each of the phases, the source frequency in Hz, and the phase rotation. If enabled, the voltage unbalance will also be displayed.

Emergency Source Status

The Emergency Source Status display shows the rms voltage of each of the phases, the source frequency in Hz, and the phase rotation. If enabled, the voltage unbalance will also be displayed.

Source Acceptability

The CP considers a source unacceptable if any of these conditions are true:

- Any phase voltage of the source is less than the voltage dropout setting.
- Any phase voltage is greater than voltage trip setting for more than 3 sec.
- Frequency of the source is less than the frequency dropout setting.
- Frequency is greater than frequency trip setting for more than 3 seconds.
- Phase rotation does not match specified phase rotation (only if enabled).
- The phase unbalance is greater than the unbalance dropout setting (only if enabled).

The CP considers a source acceptable again when all these conditions are true:

- Each phase voltage is greater than the voltage pickup setting.
- Each phase voltage is less than trip voltage setting by more than 2% of nom
- The frequency of the source is greater than the frequency pickup setting.
- Frequency is less than the frequency trip setting by more than 2% of nom.
- Phase rotation matches the specified phase rotation (only if enabled).
- The phase unbalance is less than the unbalance pickup setting (only if enabled).

Display Messages and their Meaning

The following messages (in alphabetical order) can appear on the CP display:

Display Message	Meaning or Explanation	Also Refer To
ATS LOCKED OUT!	An error condition has occurred and the controller has locked out all further attempts to transfer the load. Press the Alarm Reset pushbutton to clear this message.	Transfer Switch Operator's Manual
EMERG SOURCE	The emergency status display shows the emergency voltages, voltage unbalance (if enabled), and frequency.	page 3–1
ENGINE EXERCISE WITH LOAD	The engine exerciser is running the engine–generator set with load (the transfer switch transfers the load to the generator).	pages 2–10, 2–11
ENGINE EXERCISE WITHOUT LOAD	The engine exerciser is running the engine–generator set without load (the transfer switch does not transfer the load to the generator).	pages 2–10, 2–11
Enter Password:	A password is required to proceed further in the change process. Enter the correct password to continue or press the **Esc** key to clear this message.	pages 2–1, 2–8
FAILURE TO SYNCHRONIZE ALARM	The failure to synchronize time delay has expired. This alarm occurs when the sources fail to synchronize within the specified time. Press the Alarm Reset pushbutton to clear this message. (4ACTS, 7ACTS, 7ACTB)	pages 4–4, 4–5
Load Disconnected	The load is disconnected (4ADTS,7ADTS,7ADTB)	pages 4–6, 4–7
Load on Emerg	The load is connected to the emergency source.	
Load on Normal	The load is connected to the normal source.	
LOAD SHED FROM EMERG	The load shed signal is active and the load has been shed from the emergency source.	page 2–6
LOAD SHED FROM NORMAL	The load shed signal is active and the load has been shed from the normal source.	page 2–6
NORMAL FAILED	The normal source is not acceptable.	page 3–1
NORMAL OK	The normal source is accepted.	page 3–1
NORMAL SOURCE	The normal status display shows the normal source voltages, voltage unbalance (if enabled), and frequency.	page 3–1
POWER–UP INHIBIT *stays on*	The controller has powered up and has recognized an error condition.	Contact ASI
TD Emerg>Normal:	The emergency to normal load transfer time delay (Feature 3A) is running. The amount of time remaining is shown.	page 2–4
TD Engine Cooldown:	The engine–generator set unloaded cooldown time delay (Feature 2E) is running. The amount of time remaining is shown.	page 2–4
TD Load Disconnect:	The load disconnect time delay is running. The amount of time remaining is shown. (4ADTS, 7ADTS, 7ADTB)	pages 4–6, 4–7

continued on next page

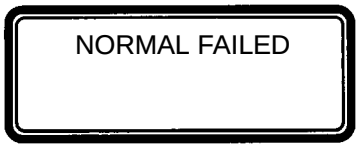
Display Messages and their Meaning (continued)

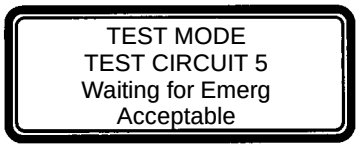
The following messages (in alphabetical order) can appear on the CP display:

Display Message	Meaning or Explanation	Also Refer To
TD Normal Fail:	The normal source failure time delay (Feature 1C) is running. The amount of time remaining is shown.	page 2–4
TD Normal>Emerg:	The normal to emergency load transfer time delay (Feature 2B) is running. The amount of time remaining is shown.	page 2–4
TD Post Transfer	The post–transfer time delay (Feature 31M or 31N) is running. The amount of time remaining is shown.	page 2–4
TD Pre Transfer	The pre–transfer time delay (Feature 31F or 31G) is running. The amount of time remaining is shown.	page 2–4
TEST MODE SERIAL COMM	A test has been initiated via the serial communications port.	page 2–13
TEST MODE TEST CIRCUIT 5	Test circuit Feature 5 is active (**Transfer Test**).	Transfer Switch Operator's Manual
TEST MODE TEST CIRCUIT 17	Test circuit Feature 17 is active (remote test).	page 2–6
Transfer to Emerg Inhibited	Load transfer to emergency is inhibited.	
Transfer to Normal Inhibited	Load transfer to normal source is inhibited.	
Waiting for Emerg Acceptable	The controller is waiting for the emergency source to become acceptable so that it can continue in the transfer sequence.	page 3–1
Waiting for In–Phase	The controller is waiting for the sources to come in phase so that it can make an in phase load transfer. The phase angle and frequency difference are also displayed. This message will be displayed until the sources come in phase. (4ATS, 7ATS, 7ATB)	pages 4–1, 4–2
Waiting for In–Sync	The controller is waiting for the sources to come into synchronism so that it can make a closed–transition load transfer. The three parameters required for synchronization (phase angle, frequency difference, and voltage difference) are also displayed. If the sources do not have the same rotation, this will also be displayed. (4ACTS, 7ACTS, 7ACTB)	pages 4–4, 4–5
WRONG PASSWORD !!!	An incorrect password has been entered.	page 2–1
XTD PARALLEL ALARM	The extended parallel time delay has expired, which indicates that the sources have been paralleled for longer than the specified extended parallel time. Press the Alarm Reset pushbutton to clear this message. (4ACTS, 7ACTS, 7ACTB)	pages 4–4, 4–5
PARM CHCKSUM ERROR	An internal memory error has been detected. On occurance of this error message, memory is cleared and all parameters need to be reset.	Contact ASI
UNKNOWN ERROR	System error.	Contact ASI

Open–Transition (2–position) Automatic Transfer (4ATS,7ATS,7ATB)

Load Transfer To Emergency





The sequence for load transfer to the emergency source begins automatically when the controller detects a normal source failure or a transfer test signal.

Normal Source Failure. The Normal source is considered unacceptable when any one of six voltage, frequency, or phase rotation conditions occur (see page 3–1).

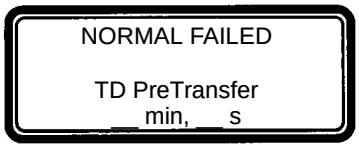
Transfer Test Signal. Test transfer signal can be from the **Transfer Control** switch (Feature 5), the engine–generator exerciser clock (Feature 11C), or via the serial port (Feature 72A). When using the **Transfer Control** switch, it must be held in the *Transfer Test* position until the emergency source becomes available (within 15 seconds).

The controller begins the load transfer sequence by de–energizing the SE relay and starting the Feature 1C time delay. Feature 1C time delay on engine starting prevents nuisance starting of the engine–generator set and load transfer to emergency due to momentary failures of the normal source. If the normal source is restored (voltage returns above the dropout point) while Feature 1C time delay is running, the SE relay is re–energized and the transfer sequence is terminated. (For transfer test the Feature 1C time delay is bypassed.)

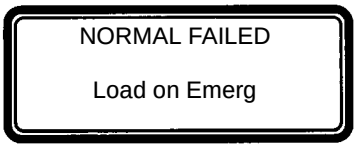
Engine Start Signal. When the Feature 1C time delay ends, the controller de–energizes the NR relay which signals the engine–generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine–generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

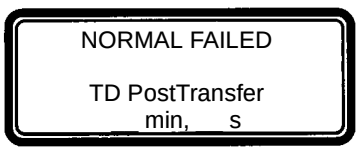
Feature 31F



At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31 output will be active while the time delay runs. Also, if Feature 27 inphase monitor control (for motor loads) is enabled, the controller will inhibit transfer until the sources are in phase.



Load Transfer. To transfer the load to the emergency source the controller energizes ER relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. Transfer switch is now supplying the load from emergency source.

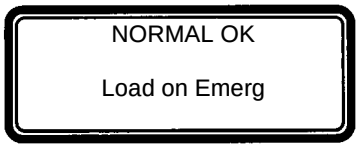


If enabled, Feature 31M time delay will run after the transfer and the Feature 31 output will be active while the time delay runs.

Feature 31M

Open–Transition (2–position) Automatic Transfer Switches continued

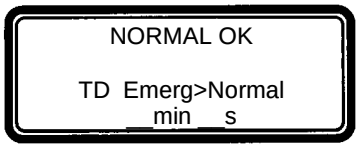
Load Retransfer To Normal



The sequence for load retransfer to the normal source begins automatically when the controller detects a restored normal source or a cancelled transfer test signal.

Normal Source Restoration. The Normal source is considered acceptable again when all six voltage, frequency, or phase rotation conditions occur (see page 3–1).

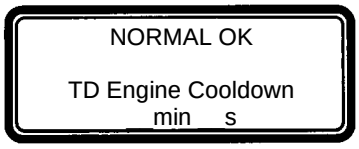
Cancel Transfer Test. Removal of the test transfer signal can be by the **Transfer Control** switch (Feature 5), engine–generator exerciser clock (Feature 11C), or via serial port (Feature 72A). When using the **Transfer Control** switch, it must be released from the *Transfer Test* position.



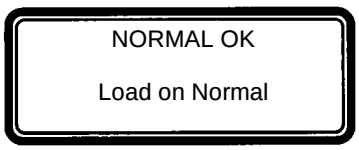
The controller begins the load retransfer sequence by starting the Feature 3A time delay. Feature 3A time delay on retransfer to normal allows the normal source to stabilize. If the normal source fails while the Feature 3A time delay is running, the controller waits for the normal source again to become acceptable and restarts the Feature 3A time delay. If the emergency source fails while Feature 3A is running, the controller bypasses the time delay for immediately load retransfer. To bypass Feature 3A time delay, turn the **Transfer Control** switch to the *Retransfer Delay Bypass* position.

At the conclusion of the Feature 3A time delay, the controller is ready to transfer the load to normal. If Feature 27 inphase monitor control is enabled, the controller will inhibit transfer until the sources are in phase.

Load Retransfer. To retransfer the load to the normal source the controller de–energizes ER relay and energizes SE relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. The transfer switch is now supplying the load from the normal source again

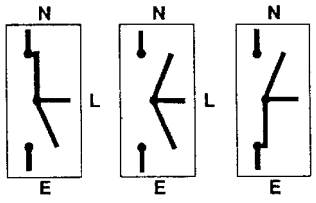


Engine Cooldown & Stop. After load retransfer to the normal source, the controller starts Feature 2E time delay. Feature 2E time delay provides an unloaded cooldown running period for the engine–generator. At the end of the time delay, the controller energizes the NR relay and the engine–generator is signalled to shutdown.



Closed–Transition Automatic Transfer (4ACTS, 7ACTS, 7ACTB)

The 4ACTS, 7ACTS, and 7ACTB provides load transfer in either closed (make–before–break) or open (break–before–make) transition modes depending upon the condition of the two power sources. Control logic automatically determines whether the load transfer should be open or closed transition. If both sources are acceptable, such as during a transfer test or when retransferring back to Normal, closed–transition transfer occurs without interrupting the electrical loads. If either source is not present, such as when normal fails, open–transition load transfer occurs in the break–before–make mode.



Open–Transition Load Transfer to Emergency Source due to Normal Source Failure

The sequence for open–transition load transfer to the emergency source begins automatically when the controller detects an unacceptable normal source. The Normal source is considered unacceptable when any one of six voltage, frequency, or phase rotation abnormal conditions occur (see page 3–1).

NORMAL FAILED

Normal Source Failure. An under voltage condition on any phase of the normal source means that the voltage has fallen below the preset dropout point.

The controller begins the load transfer sequence by de–energizing the SE and SE2 relays and starting the Feature 1C time delay. Feature 1C time delay on engine starting prevents nuisance starting of the engine–generator set and load transfer to emergency due to momentary failures of the normal source. If the normal source is restored (voltage returns above the dropout point) while Feature 1C time delay is running, the SE and SE2 relays are re–energized and the transfer sequence is terminated. (For transfer test the Feature 1C time delay is bypassed.)

Engine Start Signal. When the Feature 1C time delay ends, the controller de–energizes the NR relay which signals the engine–generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Both voltage and frequency must reach preset pickup points before the emergency source is accepted. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine–generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

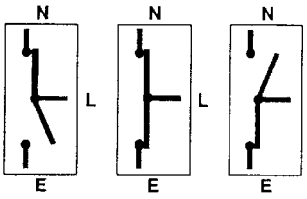
When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31F output will be active while the time delay runs.

TEST MODE
TEST CIRCUIT 5
Load on Emerg

Load Transfer. To transfer the load to the emergency source the controller energizes the ER relay. The transfer switch CN coil energizes, and all CN transfer switch contacts (mains, controls, auxiliaries) reverse position to disconnect the Normal source. Then the controller energizes the ER2 relay. The transfer switch CE coil energizes, and all CE transfer switch contacts (mains, controls, auxiliaries) reverse position to connect the Emergency source. The transfer switch is now supplying the load from emergency source. If enabled, Feature 31M time delay will run after the transfer and the Feature 31M output will be active while the time delay runs.

Closed–Transition Automatic Transfer Switches continued



TEST MODE
TEST CIRCUIT 5
Waiting for Emerg
Acceptable

Closed–Transition Load Transfer to Emergency Source due to Transfer Test

The sequence for closed–transition load transfer to the emergency source begins automatically when the controller detects a transfer test signal.

Transfer Test Signal. Test transfer signal can be from the **Transfer Control** switch (Feature 5), the engine–generator exerciser clock (Feature 11C), or via the serial port (Feature 72A). When using the **Transfer Control** switch, it must be held in the *Transfer Test* position until the emergency source becomes available (within 15 seconds).

The controller begins the load transfer sequence by de–energizing the SE, SE2, and NR relays. Feature 1C engine starting time delay is bypassed during transfer test.

Engine Start Signal. When the NR relay de–energizes it signals the engine–generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Both voltage and frequency must reach preset pickup points before the emergency source is accepted. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine–generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

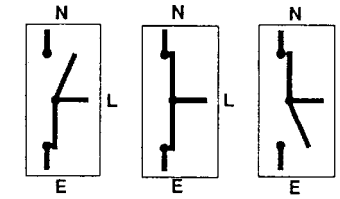
At the conclusion of the Feature 2B time delay, the controller starts the synchronization time delay which allows both sources to stabilize. After the synchronization time delay, the controller starts the in–sync monitor. Three criteria must be met for the sources to be considered in–sync. The phase difference between the sources must be less than 5 degrees, the frequency difference must be less than 0.2 Hz, and the voltage difference must be less than 5%. These parameters are displayed. The controller waits for the sources to become in–sync. At the same time, the failure to sync time delay is running. If the failure to sync time exceeds the user selected time, the failure to sync output is activated and remains active until it is reset via the alarm reset. The controller continues the transfer sequence even after the failure to synchronize alarm becomes active.

TEST MODE
TEST CIRCUIT 5
Load on Emerg

When the sources become in–sync the controller is ready to transfer the load to emergency.

Load Transfer. To transfer the load to the emergency source the controller energizes the ER2 relay. The transfer switch CE coil energizes, and all CE transfer switch contacts (mains, controls, auxiliaries) reverse position. The load is connected to both the Normal and Emergency sources. The extended parallel time delay is started and the controller energizes the ER relay. The transfer switch CN coil energizes, and all CN transfer switch contacts (mains, control, auxiliaries) reverse position to disconnect the Normal source. The load is now only connected to the Emergency source. If the sources are paralleled longer than the extended parallel time setting the controller activates an extended parallel output. It also deenergizes the ER and ER2 relays, energizes the SE and SE2 relays, and it locks out any further transfer operations. This lock–out condition is reset via the alarm reset.

Closed–Transition Automatic Transfer Switches continued



NORMAL OK

Load on Emerg

NORMAL OK

TD Emerg>Normal
__min __s

NORMAL OK

TD Engine Cooldown
__min __s

NORMAL OK

Load on Normal

Closed–Transition Load Retransfer To Normal

The sequence for load retransfer to the normal source begins automatically when the controller detects a restored normal source or a cancelled transfer test signal.

Normal Source Restoration. The Normal source is considered acceptable again when all six voltage, frequency, or phase rotation conditions occur (see page 3–1).

Cancel Transfer Test. Removal of the test transfer signal can be by the **Transfer Control** switch (Feature 5), engine–generator exerciser clock (Feature 11C), or via serial port (Feature 72A). When using the **Transfer Control** switch, it must be released from the *Transfer Test* position.

The controller begins the load retransfer sequence by starting the Feature 3A time delay. Feature 3A time delay on retransfer to normal allows the normal source to stabilize. If the normal source fails while the Feature 3A time delay is running, the controller waits for the normal source again to become acceptable and restarts the Feature 3A time delay. If the emergency source fails during while Feature 3A is running, the controller bypasses the time delay for immediately load retransfer. To bypass Feature 3A time delay, turn the **Transfer Control** switch to the *Retransfer Delay Bypass* position.

At the conclusion of the Feature 3A time delay, the controller starts the synchronization time delay which allows both sources to stabilize. After the synchronization time delay the controller starts the in–sync monitor and the failure to sync time delay. When the sources become in–sync the controller is ready to transfer the load to normal.

Load Retransfer. To retransfer the load to the normal source the controller de–energize the ER and ER1 relays and energizes the SE relay. The transfer switch CN coil energizes, and all CN transfer switch contacts (mains, controls, auxiliaries) reverse position to connect the Normal source. The load is now connected to both sources. The extended parallel time delay is started and the SE2 relay is energized. The transfer switch CE coil energizes, and all CE transfer switch contacts (mains, controls, auxiliaries) reverse position to disconnect the Emergency source. The transfer switch is now supplying the load from the normal source again. If the sources are paralleled longer than the extended parallel time setting the controller activates an extended parallel output. It also deenergizes the SE and SE2 relays, energizes the ER and ER2 relays, and it locks out any further transfer operations. This lock–out condition is reset via the alarm reset.

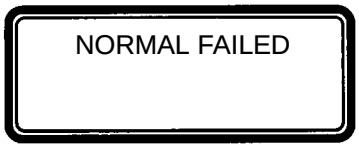
Engine Cooldown & Stop. After load retransfer to the normal source, the controller starts Feature 2E time delay. Feature 2E time delay provides an unloaded cooldown running period for the engine–generator. At the end of the time delay, the controller energizes the NR relay and the engine–generator is signalled to shutdown.

Bypass Closed–Transition Load Transfer

A pending closed–transition load transfer can be bypassed by using the Closed Transition Bypass switch. Depending upon the configuration of the controller, bypassing the closed–transition load transfer sequence will result in either an open or delayed–transition transfer.

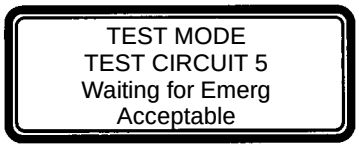
Delayed–Transition Automatic Transfer (4ADTS, 7ADTS, 7ADTB)

Load Transfer To Emergency



The sequence for load transfer to the emergency source begins automatically when the controller detects a normal source failure or a transfer test signal.

Normal Source Failure. The Normal source is considered unacceptable when any one of six voltage, frequency, or phase rotation conditions occur (see page 3–1).



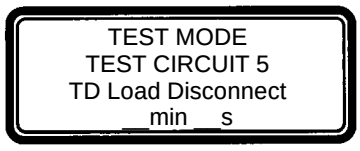
Transfer Test Signal. Test transfer signal can be from the **Transfer Control** switch (Feature 5), the engine–generator exerciser clock (Feature 11C), or via the serial port (Feature 72A). When using the **Transfer Control** switch, it must be held in the *Transfer Test* position until the emergency source becomes available (within 15 seconds).

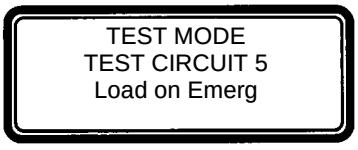
The controller begins the load transfer sequence by de–energizing the SE and SE2 relays and starting the Feature 1C time delay. Feature 1C time delay on engine starting prevents nuisance starting of the engine–generator set and load transfer to emergency due to momentary failures of the normal source. If the normal source is restored (voltage returns above the dropout point) while Feature 1C time delay is running, the SE and SE2 relays are re–energized and the transfer sequence is terminated. (For transfer test the Feature 1C time delay is bypassed.)

Engine Start Signal. When the Feature 1C time delay ends, the controller de–energizes the NR relay which signals the engine–generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Both voltage and frequency must reach preset pickup points before the emergency source is accepted. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine–generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency.

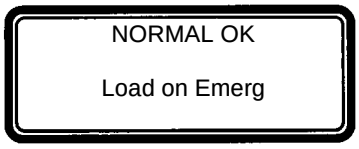




Load Transfer. To transfer the load to the emergency source in a delayed–transition mode the controller energizes ER relay first. The transfer switch CN coil energizes and opens the CN transfer switch contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends, the controller energizes the ER relay. The transfer switch CE coil energizes and closes the CE transfer switch main contacts. The transfer switch is now supplying the load from emergency source.

Delayed–Transition Automatic Transfer Switches continued

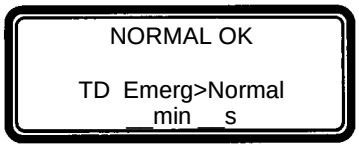
Load Retransfer To Normal



The sequence for load retransfer to the normal source begins automatically when the controller detects a restored normal source or a cancelled transfer test signal.

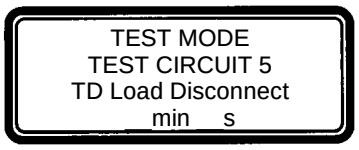
Normal Source Restoration. The Normal source is considered acceptable again when all six voltage, frequency, or phase rotation conditions occur (see page 3–1).

Cancel Transfer Test. Removal of the test transfer signal can be by the **Transfer Control** switch (Feature 5), engine–generator exerciser clock (Feature 11C), or via serial port (Feature 72A). When using the **Transfer Control** switch, it must be released from the *Transfer Test* position.

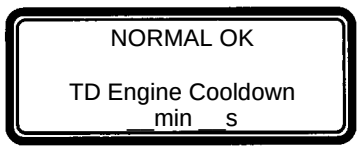


The controller begins the load retransfer sequence by starting the Feature 3A time delay. Feature 3A time delay on retransfer to normal allows the normal source to stabilize. If the normal source fails while the Feature 3A time delay is running, the controller waits for the normal source again to become acceptable and restarts the Feature 3A time delay. If the emergency source fails during while Feature 3A is running, the controller bypasses the time delay for immediately load retransfer. To bypass Feature 3A time delay, turn the **Transfer Control** switch to the *Retransfer Delay Bypass* position

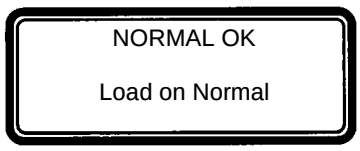
At the conclusion of the Feature 3A time delay, the controller is ready to transfer the load to normal.



Load Retransfer. To retransfer the load to the normal source in a delayed–transition mode the controller de–energizes the ER and ER2 relays and energizes the SE2 relay. The transfer switch CE coil energizes and opens the CE transfer switch main contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends the controller energizes the ER relay. The transfer switch CN coil energizes and closes the CN transfer switch main contacts. The transfer switch is now supplying the load from the normal source again



Engine Cooldown & Stop. After load retransfer to the normal source, the controller starts Feature 2E time delay. Feature 2E time delay provides an unloaded cooldown running period for the engine–generator. At the end of the time delay, the controller energizes the NR relay and the engine–generator is signalled to shutdown.



Controller Cover Removal

⚠ DANGER

Hazardous voltage capable of causing shock, burns, or death is connected to controller. Deenergize all power before removing cover.

NOTICE

ATTENTION

Observe precautions for handing electrostatic sensitive devices.

Touch ground first !
Electrostatic
sensitive device.

The Group 5 controller (CP) is used for sensing, timing, and control functions with 4000 & 7000 Series Automatic Transfer Switches. This Appendix shows the controller DIP switch actuator settings and jumper block settings for input voltage, frequency, phases, and type of transfer switch used (open, closed, delayed transition). These controls should only be used by trained technicians from ASCO Services, Inc. (ASI 1–800–800–2726).

DIP switch actuators see page A–2

Voltage jumper blocks see page A–4

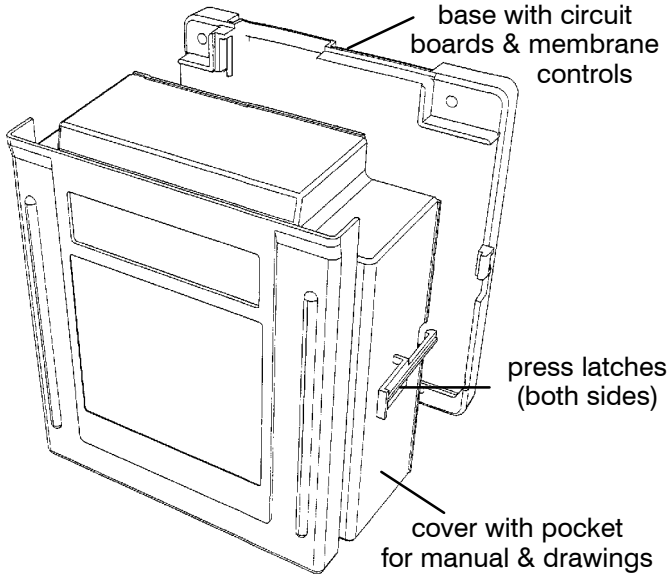


Figure A–1. Cover release latches.

⚠ CAUTION

Any indiscriminate change in DIP switch and jumper block settings may damage the controller and/or cause an inoperative ATS.

⚠ CAUTION

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to local ordinances.

DIP Switch Actuators

The DIP switch in the Group 5 controller is located on the right side through a opening in the base. The following tables show what each actuator does.

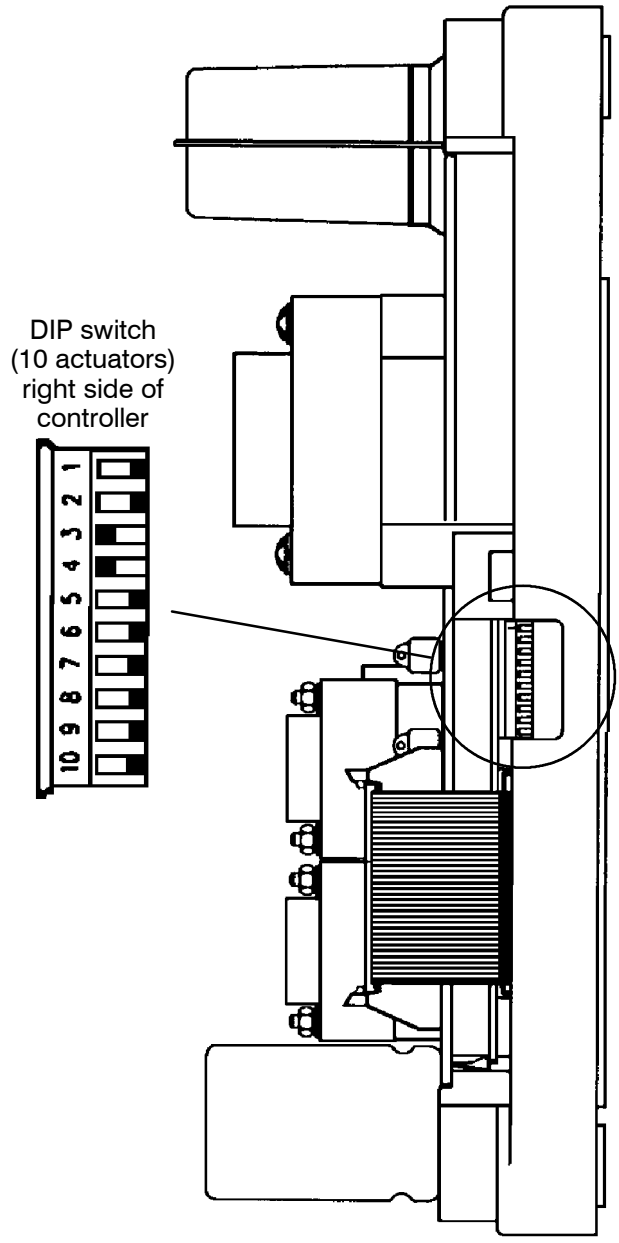


Figure A–2. Location of DIP switch.

Transfer Switch Type

DIP switch actuators 1 and 2 select the type of transfer switch used with the controller (open–transition, closed–transition, or delayed–transition). See Table A.

Table A. Transfer switch type — DIP actuators 1 & 2.

DIP switch actuator	open transition or *		closed transition	delayed-transition
1	⇨	⇦	⇦	⇨
2	⇨	⇦	⇨	⇦

* For open–transition, both actuators 1 & 2 must be in the same position (either both right or both left).

⚠ CAUTION

To avoid permanently damaging the Group 5 controller and/or disabling it, be certain that the setting matches the transfer switch type.

Nominal Source Voltage Selection

DIP switch actuators 3, 4, 5, and 6 select the input voltage to the controller. See Table B.

⚠ CAUTION

To avoid permanently damaging to the Group 5 controller, be certain that the voltage setting matches the transfer switch system voltage.

Table B. Nominal Input Voltage — DIP actuators 3, 4, 5, & 6.

DIP switch actuator	Input Voltage to Controller															
	115	120	208	220	230	240	277	380	400	415	440	460	480	550	575	600
3	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨
4	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨
5	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨
6	⇦	⇦	⇦	⇦	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨	⇨	⇨	⇨	⇨

Frequency of Sources

DIP switch actuator 7 selects either 50 or 60 Hz source frequency. See Table C.

Table C. Source Frequency — DIP actuator 7.

DIP switch actuator	50 Hz	60 Hz
7	⇦	⇨

Phases of Normal & Emergency Sources

DIP switch actuators 8 and 9 select either 1 phase or 3 phase for the Normal and Emergency sources. See Tables D and E.

Table D. Normal Source Phases — DIP actuator 8.

DIP switch actuator	1 Phase	3 Phase
8	⇦	⇨

Table E. Emergency S. Phases — DIP actuator 9.

DIP switch actuator	1 Phase	3 Phase
9	⇦	⇨

Data Input Lock

The Group 5 controller has an external input for a dry contact that, if closed, prevents setting changes from the keypad. DIP switch actuator 10 selects either yes or no for the external input (such as a key switch). Placing DIP switch actuator 10 in the **Yes** position enables the controller to respond to the external input. See Table F.

Lost or Forgotten Password

Moving DIP switch actuator 10 to the **Yes** position will allow a new password to be input (as long as the external input is open). Once the new password has been entered, return DIP switch actuator 10 to the **No** position. See Table F.

Table F. Lock Input — DIP actuator 10.

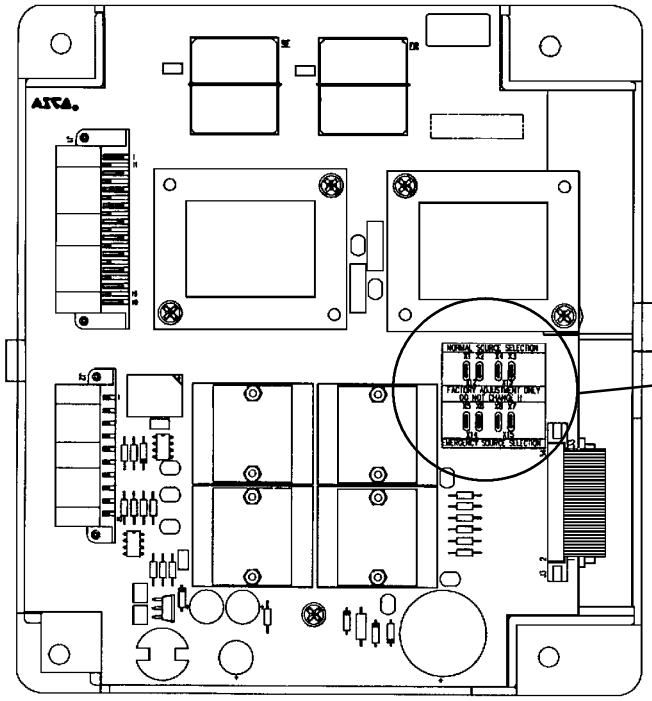
DIP switch actuator	Yes	No
10	⇦	⇨

Voltage Jumper Blocks

⚠ CAUTION

To avoid permanently damaging the Group 5 controller, be certain that the voltage setting matches the transfer switch system voltage.

Eight jumper blocks on the Group 5 controller are arranged in one of two patterns for the power supply to meet the requirements of the 16 different voltage inputs (shown in Table B on page A–2). These jumpers are located on the front right side near the ribbon cable. See Figures A–3 and A–4.



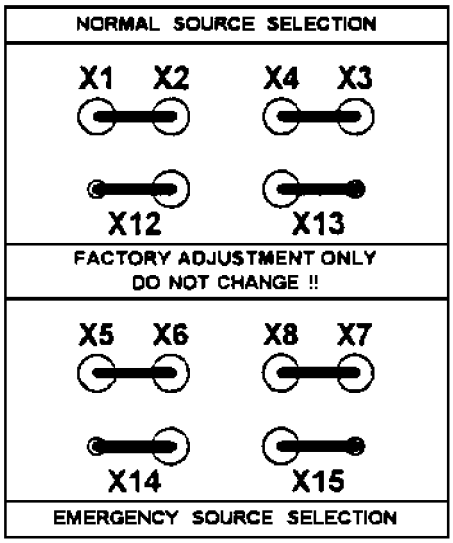
Note: Also see page A–2 for Nominal Source Voltage Selection DIP switch actuator settings.

jumper blocks (see Figure A–4)

Figure A–3. Location of jumper blocks.

Nominal voltage
115 — 277 V
(115, 120, 208, 220, 230, 240, 277)

Position jumpers HORIZONTALLY



Nominal voltage
380 — 600 V
(380, 400, 415, 440, 460, 480, 550, 575, 600)

Position jumpers VERTICALLY

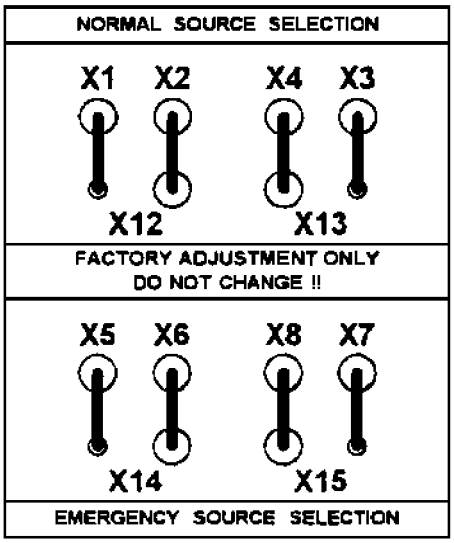


Figure A–4. Power supply jumper arrangements.

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